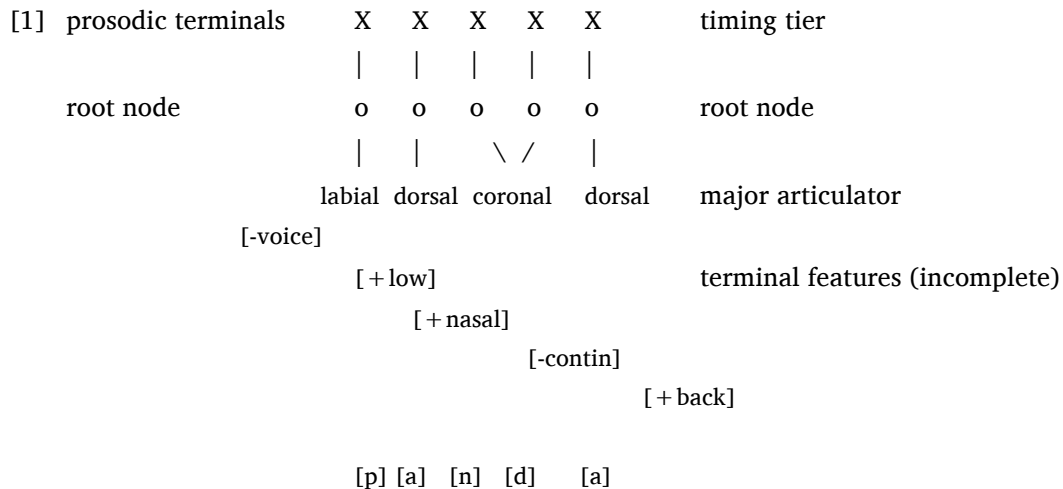


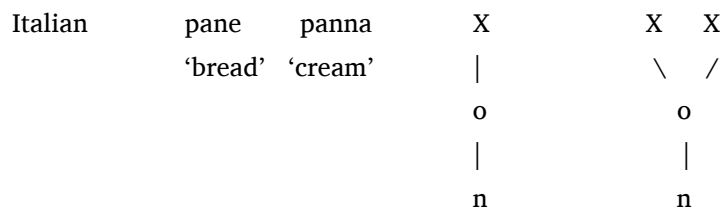
24.961 Feature organization-1

[0] originally prosodic features of length and stress were treated as a feature: [\pm long], [\pm stress] but this raised a number of problems

- length is never assimilated (though it can be compensated, see below)
- geminates behave like a sequence of two segments for prosodic rules but like a single segment for segmental rules
- the solution suggested was to enrich the representation by positing an internal structure on the features comprising the segment sketched in [1]



[2] Long vs. short segments: representation as one root node linked to two successive timing slots; X denotes units of abstract phonological duration



[3] Kenstowicz (1970), Leben (1973)

- Geminates behave like a sequence of two segments for prosodic rules but like a single segment for segmental rules
- Lengthening of stressed vowel in Italian before single consonant but blocked by a cluster like nt or a geminate like tt: pa:ne, can.to can.na
- Two light syllables \approx one heavy syllable in Latin stress rule where stress falls on the antepenult if the penult is light but on the penult when it is heavy; both a long vowel

as well as a geminate consonant make the syllable heavy: 'hominis 'man' gen. sg. but argu'mentum 'argument', for'tūna 'luck', pu'ella 'girl'

- Palatalization of [s] in Japanese: *si boji hat aʃʃi chauffeur
- West Greenlandic Eskimo: /i,u,a/; high vowels lower word-finally or before a uvular; applies to both short and long vowels (Pyle 1970) /puguq-t/ 'bags' -> pugqu-t > puggut but /puguq/ -> puuq > po:q 'bag'

- Finnish vowel harmony affects long and short vowels

kään-tää	'to turn'	tykä-tä	'to like'
mur-taa	'to break'	halu-ta	'to want'

- Assuming that the timing tier interfaces with prosodic phonology while the features under the root node form the representations for segmental phonology then Japanese /bosi/ 'hat' and /assi/ 'chauffeur' are properly distinguished as long vs. short for accent but as just a single /s/ for palatalization

X	X X
	\ /
s	s

[4] geminate integrity

- Epenthesis in C_CC is blocked if it would split a geminate; Guerssel (1978) Berber

s-wudi	sə-tmaziyt	sə-zzit	but	tazzla	sslil
'with butter'	'with Berber'	'with oil'		'running'	'to rinse'

*Fission: penalize correspondence between a single root node in the input with multiple root nodes in the output

*Complex Onset/Coda, Dep-V

/s-tmaziyt/	*Complex	Dep-V
> sətmaziyt		*
stmaziyt	*!	
/s-zzit/		
> səzzit		*!
szzit	*!	
/tazzla/	*Fission	*Complex
> tazz.la		*
tazəzla	*!	

[5] Complete assimilation as single root node sharing two (or more) successive timing slots

Tigrinya (Schein 1981, Kenstowicz 1982)

- a velar stop is spirantized after a vowel; geminate stops resist the change

/klb/	kälbi	‘dog’	ʔa-xaləb	‘dogs’		
/rkb/	räxäb-ä	‘he found’	mə-rkab	‘to find’	yə-räkkəb	‘he finds’

- heteromorphemic /k + k/ spirantizes

/mərak-ka/ -> məraxka ‘your calf’

- active and passive verbs: passive prefix tä- syncopates in jussive and /t-/ assimilates to following consonant

active perfective	räxäb-ä	passive perfective	tä-räxb-a	‘find’
active jussive	yə-rkäb	passive jussive	yə-r-räxäb	

- complete assimilation: instead of cumbersome change of all features to agree with following segment, the process can be expressed simply as a reassociation of the timing slot X of the prefix with the root node o of the following consonant:

skeletal tier	X	X
	†	\
root node	o	o
	t	r

- correctly predicts no spirantization of root-initial velar stop even though it is heteromorphemic

active perfective	käfät-ä	passive perfective	tä-xäft-a	‘open’
active jussive	yə-xfät	passive jussive	yə-k-käfät	

- the distribution of single vs. double (multiple) linking becomes a major question (discussed under label of “OCP” Obligatory Contour Principle” (Leben 1973))

[6] Berber-2 (geminate integrity, Guerssel 1978)

- genitive prefix n- completely assimilates to a following sonorant

n-taddart 'house' l-litub 'book' w-wadu 'wind'

- breakup of a geminate (multiply-linked segment) is blocked by fission: /w-wtəm/ maps to [wwtəm] and not to [wəwtəm]
- nə-trattʃa 'net' nə-bnadəm 'human'
- l-lwiski 'wiskey' w-wtəm 'male'

/n-wtəm/	*fission	*n [+sonorant]	Dep-V	Max,Dep-Assoc
> wwtəm				**
nwtəm		*!		
nəwtəm			*!	
wəwtəm	*!			

[7] Speech disguises and slips of the tongue typically permute all the features of a segment: expressed as displacement of the root node; (cf. movement of a syntactic constituent)

Arabic root permutation (Al-Mouzaini 1980)

/ðʕrb/ 'hit' ðʕarab -> ribaðʕ, biðʕar, ðʕibar, baraðʕ, etc.

[8] empty slots and floating segments

Tiberian Hebrew definite proclitic: geminates a following oral consonant (ham-melek 'the king') but not a guttural (haa-9iir 'the city')

X	X	X
h	a	

*GG » *VV » CC (*GG = penalize a geminate guttural)

*unassociated X

/haX-melek/	*unassociated X	*VV	*CC
> hammelek			*
haX-melek	*!		
haa-melek		*!	
/haX-9iir/	*GG	*unassociated X	*VV
> haa-9iir			*
ha-9iir		*!	
ha-99iir	*!		

French liaison consonants (Clements & Keyser 1983)

un gros chat [gRo. ʃa] ‘a big cat’

un gros ours [gRo.zuRs] ‘a big bear’

g r o z ʃ a	g r o z u r s
X X X X X	X X X X X X X

<z> = segment not associated to an X-slot

/ gro<z> chat/	Dep-X
> gro<z> ʃa	
groz ʃa	*!

Onset: penalize syllables without an onset

/ gro<z> ours/	Onset	Dep-X	Dep-C
> gro .z urs		*	
gro<z> .urs	*!		
gro <z> .turs		*	*

- insertion of epenthetic element is harmonically bound by vocalization of floating segment
- distribution of liaison consonant motivated by Onset » Dep-X

[9] An alternative to X-slots as a model of timing is traditional notion of mora (Hyman 1985, Hayes 1989)

- heavy syllable contains two moras and light syllable one

σ	σ	σ	σ	σ	σ
	\	\	\	\	\ /
μ	μ μ	μ μ	μ	μ μ	μ
	/			/	
t a	t a	t a n	p a n e	p a n a	= [panna]

- For Hayes a geminate consonant is associated to the second mora of the first syllable and to the onset of the following syllable; for Hyman the onset and nuclear vowel associate to the same mora
- Latin Stress: Pe.ne.lo.pe, Ra.mo:.na, A.man.da
- the penultimate syllable is monomoraic in the first but bimoraic in the latter two

[10] Compensatory Lengthening (Hayes 1989)

Loss of a segment is compensated by lengthening adjacent segment

- Most common is loss of coda consonant leading to long vowel

Latin kas.nus > ka:nus 'gray-haired'

- Lower sonority consonants may fail to induce Compensatory Lengthening

Greek ke-komid-ka > kekomika (no CL)

- Rarely does onset loss lead to CL; mora theory designed to explain this asymmetry

Greek newos > neos, not ne:os or neo:s

- Modeled as Max-mora in OT
- see Yun (2012) for typology of CL

[11]. Some reservations about moras

- Languages like Kashmiri and Hindi have more than two degrees of length

Hindi: CVVCC > CVVC > CVV > CVC > CV (Gordon 1999)

- Tranel (1991): languages may have light geminates, as in Selkup;

Stress on rightmost heavy or else initial: qumó:qi, ámirna, u:cikkak

- coda sonorants increase duration of preceding vowels in many languages (Bantu NC, English liquids Katz 2010)

French consonnes d'allongements: vowels longer before continuants and sonorants

- When a consonant is present, the extra duration is due to coda consonant and listener ignores it; but when the coda is deleted then extra duration is noticed and vowel is categorized as long; under this scenario moras are not needed (Steriade 2007)
- Syllable-initial geminates found in a number of languages (Topintzi, Shinohara)

Southern Ryukyū Japanese (Shinohara & Fujimoto 2011)

kkara 'strength' ssa 'grass'

- Tonal contour: first mora L and then rise up to accent where a sharp fall: L...LHL
- kata'na LHL 'knife' suu'ru LHL 'head'
- initial geminate words have H on first vowel: ssu'ru HL 'medicine'
- thus here initial geminate yields a timing unit
- minimality: CV lengthened in phrase to give a phonological word longer than CV: /mi/ > mii 'eye' but no vowel lengthening with initial geminates: ssa H 'grass'
- initial geminates derive historically from loss of vowel: kusa > ssa 'grass', tikara > kkara 'strength'

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